

TO
THE MEDICAL PROFESSORS
IN THE
UNIVERSITY OF PENNSYLVANIA.

GENTLEMEN,

CONDESCEND to accept this as a small but sincere token of gratitude for the many improvements I have derived from each of your lectures.—You are all entitled to an equal share of my esteem and regard.

That you may long enjoy health and those faculties for the instruction of youth which you now so eminently possess, is the cordial wish of

Your sincere friend

And grateful pupil,

HENRY WILSON LOCKETTE.

AN

INAUGURAL DISSERTATION, &c.

AN Enquiry into the properties of the Warm Bath may be arranged under three heads—

- I. Its effects on the human body in health.
- II. Its prophylactic properties.
- III. Its medical properties, or the salutary effects obtained from it when used in diseases.

For the accomplishment of the first of these purposes, I instituted a series of experiments which, if not executed with accuracy and judgment, will at least be related with candour.

Experiment 1.

March 16, 1801. I breakfasted on bread and butter and coffee, about 8 o'clock. Three hours after, viz. about 11, having pre-

pared a bath at 98° of Fah^t. in a room the temperature of which was 67° , I went into it, my pulse beating 80 strokes in a minute. The following was the result.

Minutes.	1	3	5	7	9	11	13	15	17	19
Pulse beat.	86	75	83	78	79	85	82	79	80	70
M.	21	23	25	27	29	31				
B.	76	75	82	80	78	74				

After dressing, my pulse was examined again, and found to beat 77 strokes in a minute, at 12 o'clock 70, I did not examine it further. When I first went into the bath, it produced very pleasant sensations, but after some time a flushing of the face, and a dull pain of the head with oppression about the region of the scrobiculus cordis came on, and my respiration was not as free as before immersion. In about 15 minutes after immersion, the water felt much cooler than at first, though the temperature did not vary more than two degrees during the whole of the experiment. Just before leaving the bath I was seized with slight cramps in both feet, and felt chilly on rising out of the water.

Experiment 2.

March 23d. I breakfasted as before. At half past 10 o'clock my pulse was examined

when it beat 77 strokes in a minute in a room the temperature of which was 64° . I then put my feet in water at the temperature of 110° .

Minutes.	3	8	13	18	22	27	32
Pulse beat.	81	76	81	89	84	87	92

There was a very considerable enlargement of the veins in my feet and legs; the redness on my legs was likewise considerable. I felt a small pain in my head which left me after dressing; the temperature of the water had sunk to 101° at the conclusion of the experiment.

Experiment 3.

On the same day my friend Mr. Mitchell, a young man in perfect health, of a robust and athletic constitution, having breakfasted slightly at 8 o'clock, immersed himself at half after 11 o'clock in water heated to 107° , in a room at the temperature of 68° . His pulse, which before entering beat 72 strokes in a minute,

Minutes.	1	3	5	7	9	11	13	15
Pulse beat.	105	108	115	110	119	105	115	114

He complained greatly and said he could not bear it. It produced great redness of the skin, flushing of the face, and an inclination to sleep or drowsiness, with some difficulty of

respiration; after a while he sweated profusely, which in some measure relieved his drowsiness. I examined his pulse again after dressing, when it beat 105 strokes in a minute, and in the course of a quarter of an hour it was reduced to 84.

Experiment 4.

March 24. The same young gentleman having breakfasted as before, at the same hour, entered a bath at the temperature of 96° , in a room at 66° , his pulse beating 79 strokes in a minute,

Minutes.	2		5		10
Pulse beat.	80		68		64

I then raised the temperature to 100° , and in

Minutes.	17		20		24
Pulse beat.	82		79		80

I then increased it to 105° , in

Minutes.	30		34		39
Pulse beat.	98		101		92

after which I did not raise it further. He began to sweat freely and yawned. I examined his pulse after dressing, when it beat 77 strokes in a minute. He complained of being debilitated, and particularly of a weakness in the gastrocnemii muscles.

Experiment 5.

My friend Mr. Mitchel was also the subject of the following experiment. Having breakfasted about 9 o'clock as usual, he entered a bath at 90° Fah^t. in a room at 60°, his pulse beating 80 strokes in a minute,

$$\begin{array}{r|l} \text{In } 3 & 5 \\ \hline \text{B. } 64 & 64 \end{array}$$

I then raised the water to 100°, when it beat

$$\begin{array}{r|l|l} \text{In } 10 & 13 & 15 \\ \hline \text{B. } 72 & 72 & 73 \end{array}$$

I afterwards increased it to 105°, and his pulse

$$\begin{array}{r|l|l|l|l} \text{In } 25 & 27 & 30 & 35 & 37 \\ \hline \text{B. } 107 & 110 & 115 & 118 & 115 \end{array}$$

From the time the bath was increased to the last mentioned degree of temperature, the sweat began to flow freely, and he had some difficulty of breathing. On leaving the bath he said his head ached considerably. There was a great redness of the skin all over the body, and a flushing of the face. After he had dressed, his pulse beat 80 strokes in a minute, and was fuller than before the commencement of the experiment.

Experiment 6.

March 20th. I breakfasted at half past eight o'clock on bread and butter with a small slice

of cheefe and coffee. At half after eleven, a bath being prepared at 90° and my pulse examined which beat 83 strokes in a minute in a room at the temperature of 68° —I descended into the bath and remained there 5 minutes, when my pulse was again examined by my friend Mr. Lee—it beat 79, and in 10 minutes 80° . The temperature was increased to 98° and in five minutes my pulse beat 80° , and in ten 77° . The temperature was then further increased to 108° ; five minutes after which my pulse rose to 119° and in ten to 130° . It was then increased to 111° when in 3 minutes my pulse rose to 153° . The heat was now insupportable—It produced confusion of thought, partial delirium, tinnitus aurium, an inability to speak, dimness of sight, an intolerable pain in my head with a most painful desire to make water. My sensations were precisely such as they are in a violent state of fever. There was a great redness of the skin and flushing of the face. On raising myself out of the water I almost swooned, and being now covered with blankets, sweated very profusely. In about a quarter of an hour as I am informed (for I was too much affected by the experiment to observe it myself) a few ounces of blood were

taken from my arm which exhibited the following appearances: It was highly oxygenated and did not coagulate tho' there was on the top a thick tough inflammatory scum of a somewhat blueish colour. Many fiery particles stuck to the sides of the vessel. In fact it exhibited all the appearances of dissolved blood to those who saw it.

Experiment 7.

March 27. My friend Mr. Lee having examined his pulse which beat 60 strokes a minute, in a room at the temperature of 57° , put his feet and legs up to the garterings below the knees, in water at 98° . In 5 minutes it raised his pulse to 66 strokes. I then increased it to 105° and in 3 minutes his pulse beat 74, in 6—72. I afterwards increased it to 110° , in 3 minutes his pulse beat 79, in 6—90. He now began to sweat. On the addition of 3 degrees more, his pulse beat 101, in 6 minutes 105—and finally, on raising it to 115° his pulse in 3 minutes beat 122, in 6—130. It produced redness on his feet and legs and flushing on the face, but no pain of the head. In about 5 minutes after leaving the bath he was bled. The blood separated into crassamentum and serum, though there

was not so much of the latter as is commonly observed. The serum was coloured red by the red globules, and a small quantity of blue inflammatory crust appeared on the surface. This commenced at half past 11 o'clock, A. M.

Experiment 8.

March 30. I breakfasted on bread, butter, and coffee, about 8 o'clock. At half past 11 I prepared a bath at 98° Faht. and entered it, my pulse beating 92 strokes in a minute, in a room at the temperature of 65° . I endeavoured to keep the bath as near the same temperature as possible by repeatedly examining and making additions of warm water. The result was as follows.

M.	5		10		15		20		25		30		35		40		45		50		55		60
B.	92		84		85		81		82		84		84		85		83		79		76		77

During the time I remained in the bath I felt a slight pain in the head, and a little flush of the cheek. On coming out of the water, I was chilly, and my skin every where exhibited what is termed the cutis anserina.

Experiment 9.

April 1st. Mr. Mitchell having breakfasted as usual between 8 and 9 o'clock, at a

quarter after 10 entered a bath at 102° of Faht. his pulfe beating 80 ftrokes in a minute. I endeavoured by repeated additions of warm water to keep the bath at the fame temperature.

M. 4	10	15	20	25	30	35	40	45	50	55	60
P. 81	82	90	93	94	92	94	98	94	92	98	92

When he had remained in the bath a ſhort time he began to ſweat freely, and continued to do ſo as long as he was in it. It produced rednefs on the ſkin, flushing of the face, a flight pain of the head and a deſire to make water.

Experiment 10.

To aſcertain the comparative effects of the warm bath in toto and ex parte, I inſtituted the following experiment. The young gentleman who was the ſubject of the one laſt related, having breakfaſted as uſual, and all other circumſtances being the ſame, except that the temperature of the room was 2 deg. higher, and his pulfe 5 ſtrokes ſlower in a minute than yeſterday, put his feet and legs into water of the ſame temperature up to the garterings below the knees. The reſult was this.

M. 5	10	15	20	25	30	35	40	45	50	55	60
B. 87	89	86	88	90	90	98	99	97	94	93	90

It produced a gentle diaphoresis on the body and considerable redness on the feet and legs. His pulse was not so full and round in this as in the former experiment, though it was quite soft. In this experiment we observe the pulse to be raised several strokes higher in a minute—what can be the occasion of it? Professor Rush remarks that the situation of the body influences the frequency of the pulse, now may we not conclude that this was the cause of the difference here, since he lay down in the former and sat up in the latter?

Experiment 11.

April 4th. I breakfasted as usual about 8 o'clock, and about 20 minutes after 10, entered a bath of the temperature of 95° , my pulse beating 78 strokes in a minute, in a room the temperature of which was 74° . As in the three preceding experiments, I endeavoured to keep the water at the same temperature.

M.	2		5		10		15		20		25		30		35		40		45		50		55		60
B.	83		81		79		76		75		71		73		72		72		71		75		75		75

It produced no flushing of the face nor redness of the skin. At first it felt agreeable, but after some time rather cool. On leaving

the bath I experienced a chilly sensation, and my skin exhibited the cutis anserina. In a quarter of an hour my pulse was examined when it beat only 68 strokes in a minute. I experienced a considerable degree of lassitude with an inclination to sleep, until I had dined, when I felt as usual.

Experiment 12.

Having breakfasted about eight o'clock as usual, at 10 I went into a bath at 92° , my pulse beating eighty-four strokes in a minute and the temperature of the room 70° of Fah^t.

Minutes.	5	10	15	20	25	30
Pulse beat.	77	75	74	72	73	76

After leaving the bath I felt somewhat debilitated and was slightly affected with spasmodic contractions of the muscles (commonly denominated cramp) particularly in the thighs.

From all the experiments that have been related I deduce the following inferences.

1st. That any temperature below 98° of Fah^t. which does not produce the sensations of cold ought to be termed the *tipid* bath because it rarely or never increases the frequency of the pulse and when it does it speedily reduces it below the natural standard again. Moreover I have never observed it to produce sweating.

2d. From 98° to 105° , we should denominate the *warm*, because, it accelerates the pulse, induces very free perspiration, and does not produce any distressing symptoms.

3d. From 105 , upward we may designate by the epithet *hot* bath—I likewise conclude that the warm bath is a powerful stimulant and should never be advised or practised in inflammatory diseases or states of fever of violently morbid action.

That the warm bath so far from possessing any relaxing property which has been ascribed to it; may with propriety be considered as a most valuable tonic. That it does not debilitate so much as the *tipid* bath—and that it relieves spasms, convulsions and strictures, not by relaxing them but by removing the existing debility and stimulating the parts affected to perform their due functions, I infer from observing that the lower the degree of temperature in what I have called the *tipid* bath the greater the debility; and I have not observed any considerable degree of debility produced by it until it was increased beyond the degree to which I have limited the *warm* bath when indirect debility was induced from excess of stimulus; and that the *tipid* bath should not be used in chronic states of fever and debilita-

ted habits is as obvious as that the *warm* bath should not be recommended in diseases of violently morbid excitement. That it is unpardonable to use the *hot* bath without the utmost caution and the patient should never be immersed in it at first; but should be put in the warm bath and the temperature increased gradually until it is raised as high as is necessary. If the hot bath has such an influence on the pulse in health, how absurd and injurious must it be to direct it in inflammatory diseases; a thing too often done by physicians. It is impossible to recount the evils that may result from so preposterous a practice; even the Warm Bath must prove (similar to all other powerful remedies) very destructive in the hands of ignorant persons.

The hints and cautions that will be suggested in the sequel of this dissertation, concerning the use of the Warm Bath will supersede the necessity of expatiating more largely in this place as they will come in much better in their proper places.

Experiments with the STEAM BATH.

Having breakfasted as usual, at 10 o'clock, my pulse after undressing beating eighty strokes a minute and the temperature of the

room 70° of Fah^t. I shut myself up in a machine made for the purpose of containing vapor, into which the steam was conducted by means of a tea-kettle and tube : the following was the result.

Degrees of Therm.	Minutes.	Pulsations.
85	5	87
95	10	84
96	15	84
95	20	81
95	25	81
100	30	98
106	35	109 began to sweat
104	40	106
108	45	105
110	50	124
107	55	118
111	60	130

It produced fullness of the head but no pain, respiration was accelerated and somewhat difficult though not distressing, very great redness of the skin and flushing of the face. In 5 minutes after leaving the bath my pulse was examined and found to beat 88 strokes in a minute. I had a great inclination to sleep about an hour after, which I indulged for some minutes when it went off.

Experiment 2.

Having dined between 2 and 3 o'clock, P. M. at 6 I went into the machine above-mentioned. The steam was now thrown in

such quantity that it raised the temperature from 70° to 100° in a few minutes. My pulse beat 80 at the commencement of the experiment.

Degrees.	Minutes.	Pulsations.
100	10	86
107	15	89
107	20	92
108	25	95
112	30	111
120	35	132

It produced a copious flow of sweat, great redness of the skin, flushing of the face; but no pain of the head. I experienced none of those distressing symptoms which were felt when I entered water at a much lower temperature. I felt a little sick after leaving the bath, which immediately left me upon putting myself into a recumbent posture.

Experiment 3.

April 30. Having breakfasted as usual, at forty minutes past 9 o'clock I entered the machine, and threw into it the vapours of brandy, but by some accident the spirits caught on fire, and the experiment did not succeed as well as I could have wished. I will nevertheless relate the result, and let every person judge for himself. My pulse

beat 87 strokes in a minute, in a room at 70 deg. of Fah^t.

Degrees.	Minutes.	Pulsations.
87	5	94
90	10	94
98	15	95
97	20	95
94	25	92

It produced some redness on the skin, a very gentle diaphoresis, no pain in the head or other disagreeable symptoms. By collating this with the former experiment, we will plainly perceive that a lower degree of this raised the pulse, than of the former; but whether it effected this by its stimulating property on the external surface may be questioned as there was a considerable inhalation of the vapours by the lungs. I am induced to believe the former opinion, from the succeeding experiment with vinegar.

Experiment 4.

The following experiment was performed on the 1st day of May at half past 10 o'clock. I went into the machine into which vapours of vinegar were thrown, until it raised the temperature to 95°, the temperature of the room was 70°, and my pulse beat 84.

Degrees.	Minutes.	Pulsations.
95	5	89
100	10	90
103	15	90
104	20	90
110	25	108
112	30	120
112	35	120

It produced the usual effects of the warm bath, such as redness of the skin, flushing of the face, profuse sweats, &c. I felt no pain in my head during my stay in the bath, but in about 15 minutes after coming out, I was very much troubled with it and sickness at my stomach, and was much debilitated during the whole day. After dinner I had some fever which went off in the evening.

Experiment 5.

I again attempted to procure a bath of the vapours of brandy, by substituting an EOlipile in the place of the tea-kettle; my pulse beat 75 strokes in a minute, in a room of the temperature of 67°. The experiment commenced at 45 minutes after 10 o'clock.

Degrees.	Minutes.	Pulsations.
80	5	80 weak.
84	10	80 very weak.
84	15	80 do.
85	20	85 do.
87	25	80 do.
90	30	84 fuller.
92	35	86

It produced neither pain in the head, diaphoresis, nor flushing of the face.

From these few experiments with the steam bath I am induced to prefer it to the water bath, because, we can apply a greater degree (if necessary) of heat, than we can in the water bath without distressing the patient so exquisitely. This will cause a more considerable flow of sweat, which is a very desirable object in some instances. The difference between water and brandy is not so great as should prevail on any one to run the risk of its conflagration. The vinegar may in my opinion be used with manifest benefit in some cases, as in scurvy and inveterate cases of cutaneous diseases. It would give me great satisfaction to prosecute these experiments farther were I not prevented by indisposition, having experienced a considerable diminution of health for some weeks past, and probably in consequence of the above experiments.

II. OF THE PROPHYLACTIC PROPERTIES OF THE WARM BATH.

The politicians of all nations have esteemed it a greater mark of wisdom to prevent than to remove an evil. This maxim holds equally good with physicians, for in my opinion it requires more judgment and knowledge to obviate the predisposition, than to cure a disease after it is completely formed. In the former instance more simple and mild medicines will answer the purpose, but they must be applied with greater nicety. In the latter case more powerful remedies and greater resolution in the physician, are necessary. As there is not a more simple application than the warm bath in some shape or other, so I believe there is none more efficacious; yet if proper precautions be not taken, it may be productive of much injury. The custom of using the warm pediluvium indiscriminately, promises on the whole to do but little good. It is highly necessary to be enquired into and determined, at what time and under what circumstances, it may be recommended with propriety and the greatest prospect of success.

It is of the utmost importance to pay due regard to the condition of the system in all our prescriptions, and in none more so than in our recommendations of the warm bath. The warm bath may be applied to the feet, or the whole body, in the debility which more or less precedes every state of fever, when it acts like a charm by gently stimulating the system to take on its healthy action, and thereby prevent the formation of a disease; whereas a more powerful stimulus being applied might destroy that just equilibrium which is so necessary to health, or the abstraction of a natural stimulus might produce the same effect.—If the physician could be called at the time when there only existed that state of the system which is denominated *predisposing*, all that would be requisite to be done, would be to bathe the patient's feet in warm water. On the contrary if we wait till the accession of the fever, we not only do not relieve the patient, but increase all his symptoms, producing delirium, great anxiety, difficult respiration, and in some cases even death. By this early application of the warm pediluvium, much time and expence might be saved to the patient, and the physician relieved of no little of his anxiety of mind.

The practice of bathing the feet in warm water, under the idea of revulsion so famous among the humoral pathologists, has done more mischief than it has done good : and has destroyed numbers who might have been restored to health by remedies more adapted to the condition of the system. When we determine to use the warm bath, the patient's feet and legs should be put in up to the garterings below the knees, and kept there for the space of an hour at least. If the whole body be immersed in water, a less time will answer, observing to preserve the water nearly at the same temperature or increase it a little, for in an hour the heat will be diminished very considerably, and the latter part will be more like the cold than the warm bath. For this reason it will be necessary to make frequent additions. If these directions be attended to, the warm bath will be of manifest advantage, but if they be overlooked, it will (similar to other remedies) prove injurious or even destructive to the patient. In contemplating the many advantages which are to be derived from the early application of the most simple remedies, and how much labour and pain might be prevented thereby,

we are astonished to find so much written about the cure, and so little on the prevention of diseases. Can this be owing to the interested views of physicians, or is it rather to be attributed to the neglect of patients, in not sending for aid until the fortunate moment is passed? That the latter is the true cause will be acknowledged by every ingenuous and unprejudiced mind.

The warm bath has been recommended and practiced to obviate the debilitating effects of hot climates. Mr. Bruce says, that during his residence at Massuah, he derived very evident relief from it. The only benefit in my opinion that can be obtained from its application to the body in those climates is to preserve the skin clean, and thereby promote a free perspiration. For if the heat is already so violent as to induce indirect debility, the hot bath instead of relieving the system, will tend very much to depress it below the point of reaction. Now I should rather suppose the cold, or even the tepid bath would be of more service and promise much fairer to exonerate the system. The tepid bath not only promotes perspiration but also increases evaporation. However, as all theory must

yield to the testimony of experience, I am compelled to relinquish my theoretical speculations upon the authority of so great a man as the one quoted above to whom many others equally respectable might be added.

We can, however, better explain the operation of the warm bath in old age, when it acts like a fresh supply of oxygene to a glimmering taper. The agreeable impression it produces may supply the place of many of the natural stimuli, that by frequency of repetition have become incapable of exciting the system to the performance of its various functions. Doctor Franklin received great benefit from it. It prevented the too speedy approach of old age, and enabled him to support the infirmities of his last days with less perceptible decay. It must be continued regularly, and for a long time in this period of life to obtain its salutary effects. The degree of temperature should never be below 100° of Fahrenheit's scale and as much higher as is agreeable to the sensations of the patient.

The warm bath is found to be of eminent service in removing the constriction induced on the blood-vessels by the debilitating passion of fear, which takes place frequently in bleeding, for we often see that the blood will not

run until the patient's feet or hands are put into warm water, when the blood begins to flow, after the spasm of the vessels is removed by the stimulus of heat.

The warm bath may be used as a preventive of all those diseases which so frequently originate in crowded hospitals, jails, &c. In this instance it acts in two ways; 1st. by promoting perspiration which is so necessary for the preservation of health, that, whenever we discover any obstruction in the cuticular exhalants, we are certain the foundation of some disease is laid. 2dly. It may supply the place of some other stimuli, as fresh air, or exercise. It is practised by the ladies of some nations in the latter period of pregnancy, to render their labours more easy and expeditious. The warm bath is employed by the Ægyptian ladies, especially the Hebrew women, to render them more corpulent. In what manner it operates to produce this effect is somewhat difficult to explain.

III. OF THE MEDICAL PROPERTIES OF THE WARM BATH.

Most physicians have a predilection for some particular medicine, which, they use on all occasions, without consulting the condition of the patient's system, but it comports more with the dignity of the profession, and the improving state of science, to rely on no one remedy to the exclusion of all the rest, when the safety of the patient calls for all the relief that can be afforded by our art. It has been too much the custom among those who recommend particular medicines, to relate only the success, and not the disadvantages which attend their exhibition, which leads to their use in all cases. If they do not succeed at once they either are neglected altogether, or not continued long enough to produce the desired effect.

The warm bath has been recommended in a variety of diseases, and I have no doubt adopted with advantage in many; yet, I believe it has been used with evident detriment to the patient, and sometimes even with fatal consequences, all originating from inattention

to the directions given in a former part of this Essay, and which have been too much neglected by practitioners in all ages.

To give a minute history of the warm bath from its origin—to enter into a particular detail of all the diseases in which it has been practised with benefit, would enlarge this dissertation to a size far beyond the limits to be prescribed to Essays of this kind. I must, therefore, content myself barely to mention that it is of high antiquity, having been used both by the Greeks and Romans as a remedy for certain diseases, and also as a luxury. The excess to which it was carried by the latter nation as a luxury, may be learned from the moralists of that once great and flourishing empire. Of the benefits obtained from it in diseases, I shall now treat more largely—a part of my dissertation for which I am forced to acknowledge my obligations to others.

The warm bath promises to be of service in all states of fever, of feebly morbid action, or which are denominated atonic diseases.

MANIA.—This disease has been ranked among the opprobria medicorum by the illiterate and unthinking part of mankind in all ages ; nay, it has even been acknowledged as

incurable by some of the faculty, who have trodden in the footsteps of their predecessors and who have not dared to think for themselves. But since physicians, however, have thrown off those shackles, and observed the operations of nature, it is become, (provided it be taken in time,) as manageable as in any other diseases. When suffered to run into that stage, which I intend to mention particularly, it is found to be more difficult to remove ; yet even here, the warm bath has been used with success, if not to the entire cure of the patient at least to his manifest relief, which is a very important consideration. To obtain the beneficial effects of this remedy, we must employ it for some length of time and each particular bathing should be continued longer than usual. Dr. Rush supposes three or four hours every day. In the atonic state of mania when the violent action of the vessels has ceased, the disorder remains from a deficiency of motion in the brain, which cannot be removed by any remedy more readily, than the one under consideration ; which can be regulated and adapted so exactly to the state of the system. I should suppose, the warm bath might be practised with advantage after the morbid action in the tonic state of mania has

been sufficiently reduced, as a preventive against relapses; for as I conceive there must be an accumulation of excitability, of course the system will be more liable to be thrown into morbid action on the application of any powerful stimulus either to the mind or body. Whereas by the gentle stimulus of the warm bath that equilibrium between the excitability and excitement which is so requisite for health may be obtained. But Dr. Pagiter is of opinion that it may be used in any stage of the disease. "The pedi and manuluvia" says he "upon the principle of revulsion may have their good effects, and may with safety be used morning and evening or oftener in every species of insanity and in every temperament of the constitution whether sanguine or melancholic." I am really sorry to find such a sentence in an author who wrote in the close of the 18th century. The Doctor appears to be a man of more reading and scholastic learning than of judgment and reflection. To corroborate this opinion he in the next sentence tells us "I have more than once or twice known this practice in low nervous fevers accompanied with obstinate watchfulness, and hot dry skin bring on sleep, a fine moisture on the

“ surface of the whole body, which proved critical.” This I will grant the Doctor, but at the same time, I will not admit that it is any proof of the propriety of using it in tonic mania, for it is now well known that in the tonic state of this disease, the brain and blood-vessels are too highly excited, and it is ascertained by actual experiment that the most ready means to obtain a cure is by repeated and copious evacuations, or what I would call sedative remedies. On the contrary we apply the most powerful and durable stimulants to effect a cure of the low nervous fevers of which the Doctor speaks.

MELANCHOLY is another state of mania in which the warm bath joined with other remedies has been practiced with great success.

HYPPOCHONDRIASIS.—This disease, which is distressing to the patient and perplexing to the physician, is frequently removed by the warm bath after all other remedies have been tried to no effect. It is more particularly serviceable in those persons who are of a melancholic temperament. In those who are of a sanguine temperament it proves much more efficacious when preceded by gentle evacuations. It is found of eminent advantage in those hypochondriacal complaints attended

with convulsive symptoms which proceed from repelled eruptions.

It would be equally tedious and unnecessary to mention all the cases of the salutary effects obtained from this remedy in these forms of diseases, but there is one related by Dr. Percival, so illustrative of it, that I hope it will not be thought foreign to my purpose to lay before the reader some of the particulars. The patient was a clergyman, who said his eyes felt as though they were drawn from their sockets, a constant motion in his head from before upwards, and about his temples like the undulations of waves. The extreme sensibility of his head would not permit him to wear a hat, but all this says the Doctor is trifling in degree when compared to the distress of his mind. This gentleman, the Doctor informs us had consulted several physicians of great eminence and tried a variety of remedies in vain. At first he derived some advantage from the warm pediluvium and opium, of which he took 10 or 12 grains a day. But his relief from this source was only temporary. When he resorted to the use of the warm bath, he obtained a speedy and lasting recovery. This is the most distressing instance of the complaint I ever read of, and manifestly demonstrates

the happy consequences that may ensue from the use of the warm bath when skilfully applied.

HYSTERIA, has been supposed by many authors to be peculiar to the female sex, which the name does really imply, but I think I can add my testimony to that of Dr. Cullen, who says, “and indeed they (hysterical fits) most commonly appear in females; but they sometimes, though rarely, attack also males, never however that I have observed, in the same exquisite degree.” As to the propriety of the latter part of this sentence I am not so confident, for the most violent case I ever saw was in a man, though as I have seen but little of the complaint I cannot take upon myself to dissent from such authority as Cullen. The warm bath has been very much extolled in hysterical paroxysms, but when they attack, as the above quoted author specifies, “females of the most exquisitely sanguine and plethoric habits, and frequently affect those of the most robust and masculine constitutions” I am of opinion the warm bath must prove manifestly detrimental. However when it attacks ladies of weak and delicate habit, it may be used with advantage as an auxiliary, and even in

the other instances after the plethora is reduced, and the too great vibratility of the system remains.

I make no hesitation in recommending the warm bath in this disease when due attention is paid to the condition of the system, without which precaution any medicine must be prescribed with some uncertainty.

The warm bath will constantly tend to take off the too great vibratility of the system, which is undoubtedly the principal cause of this disease, and it may be used in many habits as a prophylaxis—being careful that it be not too hot, which would probably induce the paroxysms—a caution that ought to be observed in all cases.

TETANUS.—This disease is alarming not only to the patient, but to the physician also, for one medicine will scarce ever affect a cure twice in the same hands successively. It is therefore requisite that the physician be well provided with remedies, and as no article ranks higher in the list of antispasmodics (if there be such remedies) than the warm bath, so I think there is none which promises fairer to give relief than this. We have even instances on record of tetanus being cured by it, conjoined with small quantities of lauda-

num and antimonial wine, in which case we may conclude that the warm bath effected the greater service, for we know that small quantities of laudanum will produce no change in the disease, and as for antimonial wine we can expect very little from it.

Some authors have recommended the semicupium, others warm fomentations in preference to the warm bath—"for, says Dr. Hillary, I have more than once seen the patient "expire after being taken out of the bath, "though it was not too warm, being only "about 95° of Fahrenheit's scale, and they "said he had not been in the bath more than "20 minutes." Indeed I should not expect much benefit from a bath of this temperature, because from the eleventh experiment it appears that its stimulus is too feeble to effect any considerable change when the most powerful stimulants are required, and its sedative qualities are not great enough to obtain any relaxation of the spasms. Of course we ought not to expect the good effects of either the hot or cold bath from one of this degree of temperature. Upon the whole, I believe the hot bath may be used with fewer restrictions in tetanus, than almost any other disease to which the human body is subject.

EPILEPSY.—Of this disease I shall say but little, because so little is known. There is scarce a medicine of any considerable efficacy in the *materia medica* but what has been used in it. A cure has been sometimes effected, but it more frequently baffles the skill of the most eminent of the faculty united with the most potent remedies. Stimulants are recommended after the plethora of the system is reduced, on which it is frequently said to depend, and as there is not a more universal or powerful stimulant than the hot bath, I conclude it is as likely to effect a cure as any other medicine of that class. But I believe the cold bath has been found of more service in this disease than the hot, and in my opinion bids much fairer to perform a cure when the disease depends on a plethora.

SYNCOPE, when it depends on mal-conformation of the heart or large blood vessels, is generally looked upon as incurable, but when it depends on any other cause it may be remedied either by internal or external applications. Of the latter kind none have been found of more service than the warm bath, if it be an habitual fainting, not depending on the above mentioned cause. The bath must be employed for a long time, and with great

caution, for when too hot it will induce fainting. In sudden paroxysms of syncope I prefer the pediluvium to immersion—and in this case I would recommend the water to be between 105° and 110° of Fahr. because below that degree the stimulus is not powerful enough to excite the system to action until the excitability is exhausted.

TYPHUS.—Under this title I comprehend all those states of fever which originate from filth in confined and crowded places such as goals, ships, hospitals, &c. and such also as proceed from ill-treated acute diseases. In these states of fever the warm bath has justly acquired the highest encomiums, both from ancient and modern writers ; but some among the moderns have substituted the cold bath in its place, and, as they inform us, with great success. How two such opposite causes should produce the same salutary effects may appear somewhat incredible at first view. The warm bath relieves the troublesome symptoms of delirium, watchfulness, dry and parched skin, which so frequently attend these states of fever in a very extraordinary manner. It promotes perspiration, whereby the heat of the body is very much diminished. Some have preferred the tepid

affusion to immersion, but I should suppose the effects obtained by the latter to be more permanent. Dr. Brandis has furnished several cases wherein the most happy consequences resulted to the patient from it, but the Doctor unfortunately does not inform us of the precise temperature of the bath. Were I to judge of the degree that ought to be used from the experiments on the body in health, which have been related, I would recommend at least 100° of Fahrenheit, and as much higher as may be agreeable; to be continued not less than twenty minutes or half an hour. This remedy is rarely used in common practice on account of the inconvenience and difficulty of procuring proper vessels; but when we cannot practise immersion, I would advise affusion, because I am so thoroughly convinced of the propriety of it, that, I think it should not be omitted on any occasion.

PARALYSIS—Is a disease of very serious consequence, for it sometimes deprives the patient of all the enjoyment of his family, society, and even life itself, though he may survive the attack many years. It frequently proves the more distressing not only by depriving the patient of the use of a limb or of the whole of one side, but often injures the

ferences and not unfrequently deprives the person of the power of speech. Various have been the remedies recommended in this disease, and none with greater success (when directed with skill and proper attention to the state of the system) than the warm bath.

This disease often attacks persons of a phlethoric habit in which I should esteem the warm bath not only of no service, but highly injurious to the patient without previous evacuations. Under similar circumstances every kind of stimulating application must prove equally detrimental with the warm bath.

A decoction of fulphate of alumine and pure lime in rain water has been recommended as highly beneficial in paralytic cases, but with what prospect of success, more than we may reasonably expect from simple water, I am unable to discover. For the sulphuric acid possessing a greater affinity for lime than for alumine, will unite with it and form a very sparingly soluble compound, whilst the alumine remains behind, which I believe exerts very feeble powers in a pure and uncombined state. Baths impregnated with a variety of substances have been mentioned as serviceable, but whether any of them have produced effects that could not be obtained from

simple water, yet remains to be determined by experiment, the only certain guide to knowledge.

The SICK HEAD-ACHE, or nervous headache, has been very little attended to by physicians. Dr. Fothergill is the first who has said any thing about it : Dr. Dwight has since written a dissertation on it : and Dr. Rush delivers some very judicious observations on it in his course of lectures. I have seen the disease frequently, but never knew a radical cure performed by any remedy. The paroxysms are often relieved by the warm bath in the form of pediluvium. Dr. Dwight proposes to cure it by drinking a large draught of good cider in the morning before breakfast ; which, if the Doctor's theory of the disease be just, promises fairly to cure or rather to prevent it. This joined with regularity of life and the cold bath, is the Doctor's chief dependence, and has effected a cure more than once. As the disease is very distressing and the remedy simple, it certainly is worth trying.

Fothergill advises great abstinence joined with regularity of life, and very particularly cautions persons subject to it against dining on a variety of dishes at the same meal. Dr.

Rush thinks there is some morbid action always present in the arterial system, which must be reduced by proper evacuations, previous to the use of the warm bath, which he prefers in the form of steam. He mentions a case wherein immediate relief was experienced by throwing a blanket all over a person affected with it, then introducing a hot brick, on which vinegar was poured until the patient was bedewed with vapours. He likewise advises warm fomentations to the head, in any form that may be most convenient to to the patient or attendants.

The warm bath has been practised with great success in all the diseases of the intestines. Almost every author who has written on the diseases of the bowels has mentioned it in the most extravagant terms of panegyric: In all the different kinds of cholic it is particularly recommended; and there is scarce any such a thing as obtaining a cure of the colica pictonum without it, though this will not effect a cure by itself. In violent and obstinate constipations of the bowels, it is a sovereign remedy. In long protracted dysenteries, wherein the patient has become very much emaciated, it restores not only the proper tone to the intestines, but removes the

great degree of debility which is so distressing to the patient, and so frequently troublesome to the physician. I have seen it produce the most happy issue, in obstinate constipations, after purges had failed. In herniæ, where the intestines is confined by a stricture, the bath has been practised with manifest benefit. How it produces this effect is a question of importance to be determined. A proper solution of this query, might tend to introduce it into more general use.

That the warm bath does really possess a relaxing property, I am in very great doubt, and I am happy to find myself supported in this opinion, by so respectable authority as Dr. Darwin, who says, “The unmeaning application of the words relaxation and bracing to warm and cold bath, has much prevented the use of this grateful stimulus.” Yet it really does appear to relax those strictures: that it does remove them is sufficient for my present purpose, as the question has been already discussed in another part of this Essay. It may not be improper, in this place, to give a caution about the use of the warm bath in the disease mentioned above under this title, before sufficient evacuations have been used.

The Gout which is so constant an attendant on the luxurious, and so frequent a visitant of the devotees of Bacchanalian potation, and which so seldom obtains admittance into the habitations of industry and temperance, is of two kinds, or rather has two stages very different from each other, and requiring diametrically opposite remedies. This and the following disease have been supposed to be the same, differing only in degree, by a physician, who is one of the brightest luminaries of his country, who merits the highest honors among the sons of Æsculapius, and for whom I cannot testify my esteem in terms adequate to his worth: but yet candor and a love of truth obliges me to dissent from his opinion, in this particular instance, as I have observed the former to attack the luxurious and intemperate only; the latter, to invade equally the king in his palace and the peasant in his cottage, when exposed to the causes which induce it.

The warm bath will be no less detrimental in the first than it will be serviceable in the last, or what is called the atonic stage of the gout. When that period of the disease arrives in which it is proper to apply stimulants, none can be recommended with greater prospect of

success that the warm bath from its powerful and universal operation. It is not only found beneficial in relieving the patient's symptoms, but it is an excellent restorative to those habits which have been debilitated by repeated and severe attacks. It is likewise recommended as a very valuable preventive in those who are subject to frequent returns of the atonic state. "Where the patient is too weak to be taken out of bed and put in a bathing tub his limbs and body should be wrapped in flannels dipped in warm water" the temperature whereof should never be below 100° of Fahrenheit's thermometer and as much higher as may be agreeable to the patient's sensations.

The RHEUMATISM attacks chiefly the labouring part of mankind and those in particular who are exposed to cold and moisture, and vicissitudes of heat and cold, though none are exempt from it when exposed to its causes, as I have noticed. This disease has two states; in one of which the warm bath must be manifestly prejudicial, and in the other as evidently beneficial. In long protracted cases where sufficient evacuations have not been made in the inflammatory stage and in old worn out constitutions, it has been used with

great success, but in robust and phlethoric persons from its increasing the morbid action of the blood-vessels it proves a very inadvisable remedy without previous evacuations. Warm fermentations and rubbing the part affected with volatile and saponaceous liniments have been recommended by Dr. Monro ; but the superior efficacy of the warm bath over all other remedies, appears from the many cases recorded by Dr. Fowler, who says, “ The superior efficacy of which in the present case was unequivocal because the same sudorific regimen was employed with each of the three remedies” (meaning the tincture of guaiacum, Dover’s powder and the warm bath). The Doctor appears to think the steam even more powerful than the water bath. After relating a case in which bleeding, blistering and several kinds of diaphoretic medicines had been employed, he says “ This affords a striking proof of the efficacy of warm bathing, when several of the most powerful remedies had been administered with little or no benefit.” This mode of commending the efficacy of certain remedies is very common among physicians. It unfortunately leads to a belief that the one has been effected by a *single* remedy, when the

success of that remedy, has probably depended upon the disease having been weakened more or less, by all the remedies that had been previously used. For further information on the subject I must refer to the author's book which contains a great deal of valuable instruction, and many judiciously practical observations.

SCURVY.—I do not find any author who particularly advises the common warm bath in this disease, that is, the disease to which seamen are so much subject. The natural warm baths have been used with manifest advantage. Lind says he has recommended the feet and legs to be bathed in warm vinegar, and it was practiced with evidently good effect. Dr. Blane informs us, “Dover’s powder
“and camphor given as sudorifics have proved highly beneficial”; and, in another place he says, “every thing that relaxes the
“skin by external application also forwards the cure. The contractions of the hams,
“and the livid hardness of the calves of the legs are relieved by emollient cataplasms.
“Burying the legs in the earth which has a sensible good effect seems to act on the same
“principle. It makes the parts sweat profusely”. Now, from this sentence, I con-

clude that the warm bath is of the utmost importance, because nothing will relax the skin with more facility than warm water (to use the Doctor's term) but as I would express it, restore the action of the capillary vessels; and why burying the legs in the earth should possess any advantage, over the bath I cannot conceive; for the whole intention of it appears to be to produce a diaphoresis and I believe nothing possesses greater diaphoretic powers than the warm bath. Bathing the feet and legs in warm vinegar certainly has a double advantage. The vinegar alone promotes the venous absorption very much, which is proved by a very simple experiment, that of applying vinegar to the lips, which turns them pale by increasing the bibulous action of the veins. But when it is joined to so powerful a stimulus as heat, it cannot help accelerating the languid circulation in an eminent degree. Dr. Percival mentions a case of a lady of tender constitution, who was subject to scorbutic eruptions and enfeebled by child-bearing, who derived great benefit from warm bathing.

NEPHRITES.—Any inflammation of the kidneys is termed a nephritic complaint, whether it arises from a stone lodged there or

any other cause.—In those affections which are very distressing indeed, after sufficient evacuations by bleeding, purging, or glysters, the warm bath has been found highly serviceable, but when practised before the above-mentioned evacuations have been used, it tends to increase the morbid action of the vessels of those parts. The practice of using the warm bath in nephritic affections, is of great antiquity, having been recommended by Hippocrates and Celsus, as quoted by Van Sweeten. It has been used with advantage in almost all instances of complaints of the urinary organs. Doctor Fothergill derived considerable relief from it in his last illness, which was a disease of the bladder. There is a case related by Dr. Darwin, of such an extraordinary cure, that it may not be improper to transcribe the whole of it.

“ Mr. —, says he, had for many months
 “ been affected with an ulcer in perineo,
 “ which communicated with the urethra,
 “ through which a part of his urine was daily
 “ evacuated with considerable pain, and was
 “ reduced to a great degree of debility. He
 “ used a hot bath of 96 or 98 degrees of heat
 “ for half an hour, during about 6 months.
 “ By this agreeable stimulus repeated thus at

“ uniform times, not only the ulcer healed
 “ contrary to the expectations of his friends,
 “ but he acquired greater health and
 “ strength than he had some years previously
 “ experienced.” Warm fomentations applied
 to the region of the lions have been used with
 great success, when it has been inconvenient
 to practise the bath, either on account of the
 patient’s feebleness, or because the pain was
 so severe that he could not be moved.

LEPROSY is a disease that is rarely met
 with at present, especially in this country.
 There are some instances of it in the West-
 Indies. As it appears to be a disease of the
 skin, and the warm bath acts immediately on
 the skin, we may conclude it would be pecu-
 liarly serviceable, and accordingly we find it
 recommended in leprous complaints.

The warm bath is used in most diseases of
 the skin with manifest advantage, though we
 must not expect a complete cure from this
 remedy alone. To enumerate all the affec-
 tions of the skin in which it has been prac-
 tised, would be very tedious and not at all
 interesting; but there is a disease vulgarly
 called the surfeit, in which I should deem it
 valuable, though I have perused no author
 who recommends it. The warm bath hath

been used after the efflorescence in scarlatina with striking benefit.

Patients labouring under confluent small-pox have been much relieved by it, especially if there be any convulsions or apoplectic slumbers. The tepid effusion has been recommended and found highly serviceable in that state of the system which succeeds the excessive use and abuse of spirituous liquors. Dr. Darwin relates a case of hectic fever, in which the patient was greatly relieved by the affusion of tepid water; in some cases hectic paroxysms are completely extinguished by it, when practised in the commencement of the hot stage.

The warm bath has been recommended in almost all the diseases of women with apparently good effects. It has been much extolled in difficult labours; but it is nearly superseded by the lancet at present, which is supposed more efficacious, and certainly is more convenient. However, I am of opinion, that when practised together, the desired purpose will be obtained with more facility and expedition. We should be extremely cautious in our recommendation of it, when we have the least reason to suspect the phlogistic diathesis exists in the system—for in that case we should

act as inconsistently as a person would, who should attempt to extinguish a flame by pouring oil on it. This is the reason why puerperal fever has so often proved fatal after its use. But this state of fever is so well understood by physicians of the present day, that no one who is the least acquainted with it, would think of the warm bath until very copious evacuations had been used, after which it may be found serviceable. In all chronic complaints, in debilitated habits, from whatever cause they may originate, the warm bath has been very much dreaded, and of course neglected both by patients and physicians, under the idea of the relaxing property ascribed to it—which in my opinion, is very unjustly founded. The warm bath I conceive, acts in a manner similar to all other stimulants, when in excess, by inducing indirect debility ; but when properly accommodated to the excitability of the system must promote the due performance of all the functions. Dr. Marcard informs us, that he has seen ladies arrive at Pyrmont, so weak that they could scarcely walk, receive eminent relief from bathing in those waters, but as I am not treating of medicated waters, this may be thought not applicable to the subject, yet

I do not believe there is that difference between the medicated and simple baths as has been hitherto supposed; and that their success depends more on the change of climate, exercise and perseverance, than on any peculiar property possessed by the waters. Sterility is said to be removed by the warm bath, and thereby disconsolate couples rendered the happy parents of a numerous and flourishing offspring.

I come now to speak on a subject that is no less difficult than interesting, and which I regret I am not better qualified to enter minutely into, as well on account of the want of time as the length of this essay.

The diseases of children require the most profound skill in the practitioner and excite his tender feelings in the most compassionate manner. Most of their diseases are simple and easily managed when understood and taken in time; but when suffered to become chronic are somewhat more perplexing and often prove fatal. There are few diseases to which the infantile state is subject that the warm bath has not been recommended in; and still fewer in which it may not be used with advantage. In convulsions of all kinds it produces the happiest effects, but even in these affections

I am inclined to repeat an observation that I have several times made, that it would prove much more efficacious when preceded by some evacuation in children of sanguine temperaments.

It effected the first cure of the disease denominated skin-bound, that ever was performed. This is a disease of peculiar mortality, for near nine tenths of all the children perish who are attacked by it.

Children are frequently much oppressed with obstinate constipation, and after all other remedies have failed, the warm bath has relieved the little sufferers and snatched them from the jaws of apparently inevitable death. When children are so troubled with worms as to occasion obstinate contractions of the muscles situated on the extremities, the warm bath is essentially necessary.

To enumerate all the diseases of children in which this remedy is recommended would be a useless task for me, since I can refer to so many authors who have written expressly on them, and detailed their causes, symptoms, and cure, with a perspicuity and judgment, which do the highest honor to their names.

The Indians are subject to few diseases, though these are of the most violent and in-

flammatory kind; for the cure thereof they apply the most powerful remedies, which either kill or cure immediately. Pleurifies and rheumatisms are the diseases which most frequently occur. The principal remedy they practise in them is the warm bath, which they apply to the body in form of vapour. Their method of using it is this :

They prepare a bagnio resembling a large oven into which they introduce several hot stones ; the sick person then creeps into it and the water is immediately poured on the stones. After remaining there about half an hour, the patient runs to the river into which he plunges himself two or three times. He then returns to his wigwam, or house, passing through the bagnio to mitigate the immediate stroke of the cold, when wrapping himself in a blanket he lies down near a gentle fire turning himself frequently till dry, when he gets up and goes about his business as usual.

The Russians and Siberians have a practice of using the warm bath similar to the Indians, by confining themselves in a close place, and pouring water on heated stones till they raise the temperature to 148, and even occasionally to 168 degrees of Fahrenheit's thermometer. In this intense heat they

remain sometimes for two hours; frequently pouring hot water on their bodies—then they rush into the open air and roll themselves in the snow, when the temperature of the atmosphere is 10 degrees below Zero. Many chronic diseases are said to be cured by this remedy: and the rheumatism is said to be almost unknown in Russia. We are informed by travellers, that every person, from the sovereign to the meanest peasant, uses such artificial hot baths twice a day.

There are many other diseases, in which the warm bath has been used with success; but those that have been mentioned are sufficient to shew its efficacy.

With my best wishes for the prosperity of the University of Pennsylvania, I close this imperfect sketch of my youthful studies.

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